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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/725,769

12/02/2003

Stuart M. Lindsay

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07/20/2006

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EXAMINER

LIVEDALEN, BRIAN J

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 07/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/725,769

Applicant(s)

LINDSAY ET AL.

Examiner

Brian J. Livedalen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 27 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 and 15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

In view of the appeal brief filed on 6/27/2006, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

### ***Claim Objections***

Claims 1, 4, 12, and 13 recite the limitation "said stage". There is insufficient antecedent basis for this limitation in the claim. It is unclear to what stage is being referred. Correction is required.

### ***Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Sarkar (6806991).

In regard to claims 1 and 12, Sarkar discloses (fig. 2) a fast scanning stage for a scanning probe microscope, the scanning probe microscope including a probe (fig. 9, 901, column 7, lines 1-10), the stage comprising, at least one fixed support (fig. 10, 1002, column 7, lines 10-30), and a sample stage (202) having at least one axis of translation, the sample stage being affixed to the at least one fixed support by means for causing displacement (203 and 201) of the stage relative to the probe (column 4, lines 10-49).

Claim 13 is rejected under 35 U.S.C. 102(e) as being anticipated by Miles et al. (2004/0051542).

In regard to claim 13, Miles discloses (fig. 3) a method of operating a fast scanning stage for a scanning probe microscope, the scanning probe microscope including a probe (52), providing a sample stage (14) having a sample thereon and causing displacement of the stage relative to the probe by actuating at least one actuator element (52) to drive the stage at its resonant frequency using a sine waveform generator (not shown) (page 5, paragraph 50).

***Claim Rejections - 35 USC § 103***

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2, 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Miles et al. (2004/0051542).

In regard to claims 2, 3, 5, and 6, Sarkar discloses (fig. 2) a fast scanning probe microscope as set forth above in claim 1. Sarkar further discloses that the means for causing displacement of the stage has four actuator elements supporting the stage (203a-d and 201a-d) at each corner of the stage, which has a rectangular configuration; and the actuator elements form a parallelogram scanning element. Sarkar remains silent regarding using a sine waveform generator for actuating the at least one actuator element. However, Miles discloses (fig. 3) a scanning probe microscope with a stage (12) that is driven using a sine waveform generator (page 5, paragraph 50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sine waveform generator to drive the stage in order to drive the stage at a resonant frequency allowing measurement to take place faster and with reduced noise (page 1, paragraph 0008).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miles et al. (2004/0051542) in view of Sarkar (6806991).

In regard to claim 4, Miles discloses (fig. 3) a fast scanning stage for a scanning probe microscope, the scanning probe microscope including a probe (54), the fast scanning stage having a sample stage (14) having at least one axis of translation, the sample stage being connected to at least one actuator element (52), a sine wave generator (not shown) for actuating the at least one actuator element, in which the stage is displaced by the at least one actuator element being driven at the frequency of resonant vibrating corresponding to translation of the sample with respect to the probe (page 5, paragraph 0050). Miles is not explicit regarding a fixed support being affixed to the sample stage by the actuator. However, a fixed support would be necessary in order to provide a force to push against in order to actuate the stage by the piezo-transducer (16). Even if there is somehow no need for a fixed support, Sarkar discloses (fig. 2) a stage that is actuated by connecting a stage to a fixed support (fig. 10, 1002) via actuators (203 and 201) (column 4, lines 10-49). It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the stage to a fixed support via actuators in order to provide a secure body to provide a force so that the actuators can translate the stage effectively and accurately.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991) in view of Miles et al. (2004/0051542) as applied to claim 6, and in view of Pai et al. (6338249).

In regard to claim 7, Sarkar in view of Miles discloses (fig. 2) multiple actuators that translate the stage in two directions. Sarkar in view of Miles remain silent regarding

the actuators being electrically in parallel. However, Pai discloses a system using multiple actuators (20) that are electrically in parallel to move a single element (110) (column 3, lines 5-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to put the actuators electrically in parallel in order to control the actuators independent from each other.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991) in view of Miles et al. (2004/0051542) as applied to claim 2, and in view of Erlings (US RE37560).

Regarding claim 8, Sarkar in view of Miles discloses a translational stage displaced by piezoelectric stack actuators (column 2, lines 39-54). Sarkar in view of Miles remains silent regarding the actuator being a stack-bending element. However, Erlings teaches that piezoelectric stacks are commonly used in displacing a stage for a scanning microscope (column 1, lines 17-30). It would have been obvious to one of regular skill in the art at the time the invention was made to include the stack actuators of Erlings to the translational stage of Sarkar in view of Miles actuate larger displacements.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991) in view of Miles et al. (2004/0051542) as applied to claims 2 and 3, and in view of Zdeblick (US 4906840).

Regarding claims 9 and 10, Sarkar in view of Miles discloses a stage moveable by at least one piezoelectric stack actuator (column 2, lines 39-54). Sarkar in view of

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Miles is silent regarding a pzt bimorph actuator. However, Zdeblick discloses a pzt bimorph actuator (cantilever, fig 9) that actuates the tip of a probe (column 2, lines 43-48). It would have been obvious to one of regular skill in the art at the time the invention was made to include the pzt bimorph actuator of Zbedlick to the stage of Sarkar in view of Miles to apply the precise movement of Zbedick's probe to the motion of the stage.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Marchman (US 5811796).

Regarding claim 11, Sarkar discloses (fig. 2) a scanning probe microscope with a moveable stage. Sarkar remains silent regarding the material of the stage. However, Marchman discloses a scanning microscope including a probe (column 5, line 22), and a stage (27) having at least one axis of translation and means for causing displacement of the stage relative to the probe (column 5, lines 57-column 6 line 24). Marchman further discloses the stage (disc, 27)) being made out of a ceramic material (fig 2A, column 6, lines 32-37).

Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Miles et al. (2004/0051542) as applied to claim 13, and in view of the publication of Ando et al (A High-Speed Atomic Force Microscope for studying biological macromolecules).

Regarding claim 15, Miles discloses a stage that is displaced at a resonant frequency. Miles is silent regarding the stage having a resonant frequency at  $1/100^{\text{th}}$  of the probe's frequency. Ando teaches the actuator of a scanner having a resonant



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frequency at 8.5 kHz, 34 kHz, and 100 kHz (paragraph entitled: Imaging Bandwidth). Ando further discloses the probe having a resonant frequency of 2.5 MHz (paragraph entitled: Discussion). This range provided for the ratio of frequencies is provides about  $1/100^{\text{th}}$ . It would have been obvious to one of regular skill in the art at the time the invention was made to actuate the stage and probe of Yasuda in a relationship taught by Ando to increase the imaging bandwidth.

### ***Response to Arguments***

Applicant's arguments filed 6/37/2006 have been fully considered but they are not persuasive. In regard to claim 1, Applicant asserts that Examiner is picking and choosing multiple embodiments to piece together a rejection. However, fig. 10 is merely a more detailed description of the actuators of fig. 2. See column 4, lines 10-49.

Applicant's arguments with respect to claims 2-13 and 15 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

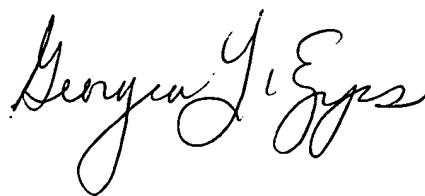
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Livedalen whose telephone number is (571) 272-2715. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bjl

Georgia Epps  
Supervisory Patent Examiner  
Technology Center 2800

A handwritten signature in black ink, reading "Georgia Epps". The signature is written in a cursive, flowing style.